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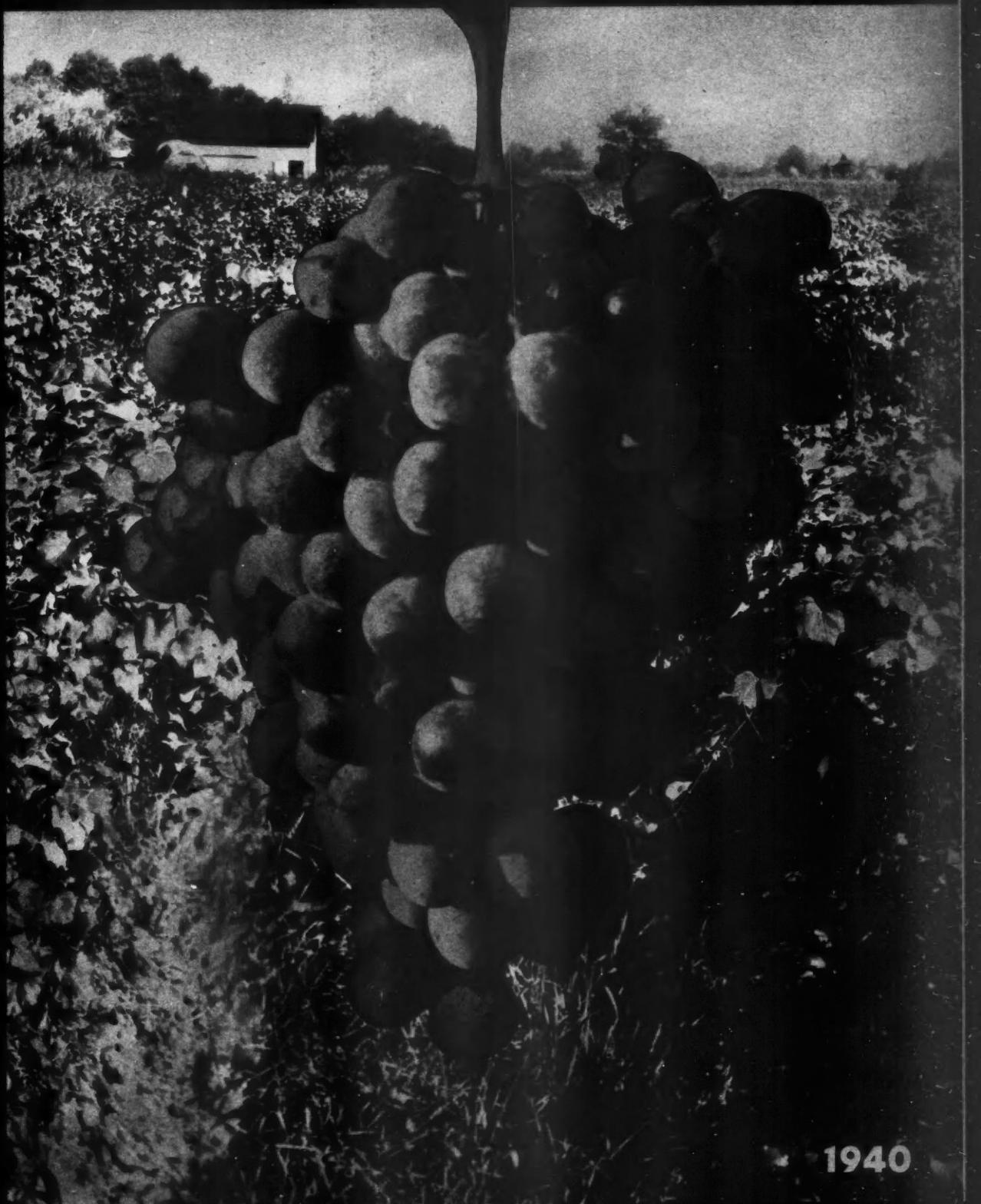
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AUGUST



1940



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Quicker starting and improved performance or your money back.

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FRUIT GROWING PRACTICES MADE POSSIBLE BY HORMONE SPRAYS

WIDESPREAD USE OF THE NEW SPRAY TO PREVENT DROP OF PRESENT CROP

BECAUSE a drop apple is no better than a cull, growers everywhere are turning to the new hormone spray to insure themselves against excessive dropping and loss of precious apple crops.

The spray prevents the formation of the abscission layer—a zone of delicate, thin-walled cells which separate easily and allow the apple to fall to the ground.

Besides giving the grower more time to pick his fruit, thus reducing the percentage of drops, the hormone spray permits picking at a later date, which allows the apples to color better and bring higher prices on the market.

Because of its newness, few growers have had the chance to try the spray in an experimental or commercial way. Indeed, work with the spray has been done largely by scientific investigators during the past season. However, growers have shown great interest in the spray and many will use it this season.

Virginia grower Harry F. Byrd was one of the few who used the spray last year. He conducted experiments on two Stayman Winesap trees and two York trees.

Grower Byrd sprayed his two Winesap experimental trees on September 21 and the apples were harvested on October 21. The drop on the two sprayed trees was 18 per cent while the drop on two unsprayed check trees was 53 per cent. The two sprayed trees yielded 50 bushels, an increase of 27½ bushels over the two unsprayed trees.

Spray was applied to the two York trees on October 21, 28 and November 1. Twenty-one boxes of fruit were harvested from the two trees on November 10. The drop was about 35 per cent while on the other York trees practically all the apples had dropped.

In 1939 in the northwestern part of Missouri 50 per cent or more of the choicest fruit fell to the ground before picking time due to abnormal weather. Widespread use of the hormone spray in this section undoubtedly would have prevented the severe dropping and saved the crop for many growers.

AUGUST, 1940

HERE IS WINNING NAME IN AMERICAN FRUIT GROWER NEW HORMONE SPRAY CONTEST

"HARVEST SPRAY"

To Royal W. Smith, fruit grower at Laconia, N. H., goes the \$10.00 cash award from AMERICAN FRUIT GROWER and the honor of winning the nationwide contest for an appropriate, non-commercial name for the new hormone spray, the magic of which prevents pre-harvest drop of apples.

The winning name voted by three nationally known judges, after careful consideration of the thousands of entries, is "HARVEST SPRAY." This title was first submitted by Mr. Smith, although three other contestants also submitted the same title; however, by postmark records their entries were not received until after Mr. Smith's suggestion had been received and recorded. Under the rules of the contest as published in AMERICAN FRUIT GROWER, Mr. Smith receives the award for being the first to submit the name, "HARVEST SPRAY."

From the thousands of names submitted a selection of the titles believed worthy of Honorable Mention has been made, as follows:

THE JUDGES

DR. M. B. HOFFMAN
Extension Professor of Pomology, New York State College of Agriculture, Cornell University.

PROF. B. S. PICKETT
Head, Department of Horticulture, Iowa State College; President, American Pomological Society.

DR. J. H. GOURLEY
Chairman, Department of Horticulture, Ohio State University; Associate Editor, AMERICAN FRUIT GROWER.

"COLOR SPRAY"
H. L. Mantle, Painesville, Ohio.

"CLING SPRAY"
A. W. Thomas, Montrose, Pa.

"NON DROP SPRAY"
Mrs. Ethyl Rader, Greeneville, Tenn.

"HOLD-MASTER SPRAY"
C. Lawrence, Baton Rouge, La.

"NEVA-DROP SPRAY"
K. C. McDaniel, Atlanta, Ga.

"MAGIC STOP DROP SPRAY"
Mrs. J. C. Herr, Lima, Ohio.

"MAGIKROP SPRAY"
Albert Fremd, Canal Point, Fla.

"SUPERIOR SPRAY"
Ora E. Roberts, Warren, Ind.

"DROP-NOT SPRAY"
Hugh Thornburg, Moberly, Mo.

"HORMOITE SPRAY"
E. A. Peterson, Crosby, Texas.

"STEM HOLD SPRAY"
Myron Sheeler, Forest Grove, Ore.

"FULL HARVEST SPRAY"
Mrs. Lee Zbornak, Belleville, Ill.

"MORE CROP SPRAY"
M. A. Harrah, Freshwater, Ore.

LEAFHOPPERS

THEY CAN REDUCE YOUR CROP

By G. Edward Marshall, N. F. Childers and Howard W. Brody
Ohio State and Purdue Universities Co-operating

If one were to make a list over the last five years of insects most often discussed in growers' meetings in Ohio and Indiana, the apple leafhopper would have to be placed among the first three. Scattered reports from the Midwest and East would indicate that the leafhopper is receiving additional attention in these locations. In the past two years, and especially this year, it is apparent that correspondence on leafhopper troubles has shown a very definite increase. It seems to be a common thing to hear growers and experiment station men make such statements as, "I am sure the leafhopper infestation in my orchard was responsible for reduced fruit size at harvest," or "The leafhopper population was so great this year that my apples did not color right" and "I wonder what all those hoppers are doing to the foliage?"

To be frank, we have little or no specific data which would answer, prove or disprove these statements. We do not know whether leafhoppers remove chlorophyll (green coloring matter) from leaves or by some means cause it to become inactive, thereby reducing carbohydrate manufacture by the leaves; or whether the foliage continues to photosynthesize food materials at a normal or near normal rate even though the leafhopper feeding has left the foliage splotched with light green patches. There also seems to be a lack of complete information on the habits and population trends of the nymph and adult leafhoppers through the season.

In order to broaden knowledge in this direction, the authors have made a four-year study, with emphasis on the

last year, on the relative number of overwintering adult hoppers, when and where during the season the greatest populations occur, the various species commonly to be found in the orchard, the species most prevalent and injurious to apple foliage, and the general habits of migration. In addition, leafhoppers have been brought from field to laboratory and allowed to feed upon experimental apple leaves, after which careful determinations were made on the effect of feeding injury on photosynthesis (food manufacture) and the amount of water vapor transpired by the leaves.

The leafhopper has three stages in its life history: the egg, the wingless nymph and the winged adult. Whether it overwinters in the egg or adult stage depends upon the species to which it belongs. In the southern Indiana orchard where most of these counts were made, it was found in the fall of last year that out of every 1000 leafhoppers counted, about 740 were of the common white apple leafhopper species (*Typhlocyba pomaria*, McAtee). Species of the grape leafhopper (*Erythroneura* sp.) comprised the balance, except for an almost insignificant number of potato leafhoppers (*Empoasca fabae*, Harris).

These potato leafhoppers apparently are weaklings and die during the cold winter temperatures. According to workers who have studied this leafhopper, it migrates in the adult stage from the South each year. On the other hand, the grape leafhopper spends the winter in the adult stage in damp decaying leaves under an apple tree or along heavily sodded fence rows. For example, last win-

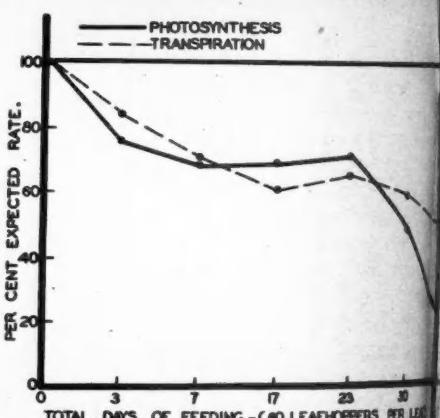
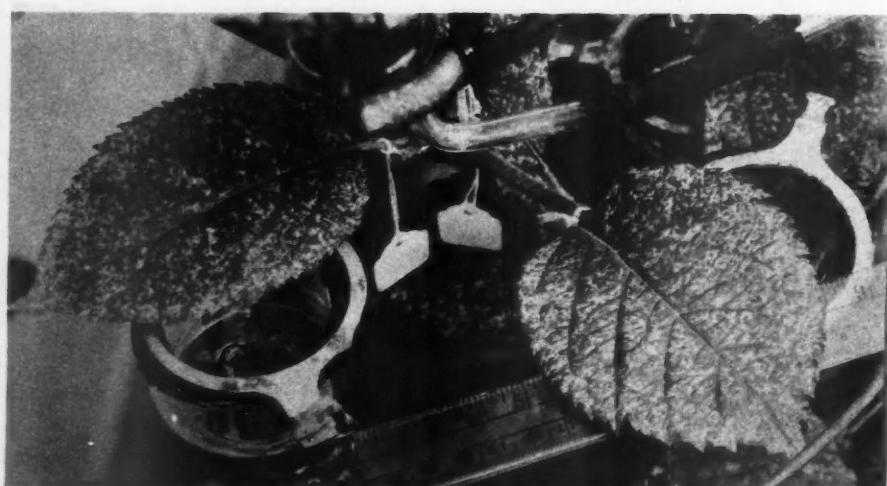


Figure 1 (top)—Prof. Marshall is shown on left in pomology greenhouse of Ohio State University catching leafhoppers in the stock cage and transferring them to cage at right which encloses experimental apple leaves. Mr. Brody guards the cage between transfers to prevent insects from escaping. A few days later the leaves will be given a metabolism test to determine how much the hoppers reduced photosynthesis by their feeding.

Figure 2 (above)—Chart showing how leafhopper feeding may reduce rate of photosynthesis. After seven days of feeding there was about a 35 per cent reduction in food manufacture and the apple leaves appeared similar to those in Figure 1.

Figure 3 (left)—Metabolism tests on apple leaves are made by attaching them to a delicate apparatus devised by Heinicke and Hoffman at Cornell. This photo, taken in Ohio State University "weather-control" chamber, shows hopper-injured leaves ready to be attached to glass leaf cups.



ter it was found that ordinarily about one-third of the ground beneath an apple tree had a fairly thin covering of leaves and grass (two inches or less) where only 140 grape leafhoppers were found to the square yard; further out beneath the drip of the branches where sod and leaves were four inches or more deep, the leafhoppers totaled 1400 per square yard. The number of leafhoppers for all ground beneath apple trees averaged about 160 per square yard, and on this basis for an acre of trees (40 per acre) there would be around 13,061 over-wintering grape leafhoppers. With the advent of warm weather and about the time buds showed green these grape hoppers emerged from beneath cover and began laying eggs in the mid-veins and petioles of the leaves—in the southern Indiana orchard this spring it was about May 1. After this they soon died.

The white apple leafhopper undergoes the winter in the egg stage. Last fall the adult female apple leafhoppers mated, then laid eggs beneath the cork cells in the bark of one to five-year wood. Most of these oblong tiny egg "humps" were found on the bark of three to four-year wood. About May 5 this spring they began to hatch into small, pale green, wingless nymphs which immediately began feeding by piercing with their "beaks" the underside of young foliage and sucking sap from an area beneath the upper skin of the apple leaves. As a result, whitish-green patches appeared on the upper leaf surface; the under surface, however, appeared to be no different than uninjured leaves except for a few brown pinhead specks of excrement.

These nymphs increased in size rapidly at intervals, or molt periods, when they emerged from their old skins and left these white flimsy "shells" hanging to epidermal hairs on the under surface of the leaves. The nymphs are lively animals. It could be said that a football game between two leafhopper-nymph teams might well equal in entertainment a Cornell-Ohio State football game. Leafhoppers can dart forward, shift to the right, shift to the left, back up and dodge in general about as cleverly as any insect in the orchard. This one characteristic makes it somewhat difficult to hit them with spray since usually they dodge to the leeward side of a branch or leaf when spray is directed at them.

Within about 23 days after hatching, the nymph undergoes its last molt period and emerges a full-grown winged adult. These adults continue to feed upon foliage, mate and lay eggs, which was about June 15 this year. The eggs hatch within about a week, depending mainly upon temperature. Thus, the second generation gets under way, which usually is

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GRAPES •

GIRDLING

California grape growers have devised many ingenious methods to increase production in their vineyards—practices which growers in other localities cannot use because cold, hard winters do not allow anything but ordinary cultural methods.

One skillful practice consists in removing a complete ring of bark from the trunks of grape vines in order to increase berry size and yields.

Girdling or ringing as this practice is called also increases the number of seedless berries without influencing the number that have seeds. It is effective because the foods manufactured in the leaves accumulate above the ring and influence the development of the clusters of blossoms or fruit.

Time of girdling has a great effect on how successful the results will be. If the ring is effective during the period of most rapid growth of berries, the size of seedless berries is increased from 30 to 100 per cent and seeded berries 20 per cent.

Double-bladed knives are used to make the ring, and great care is taken so that the cut is not made too deeply into the wood. An ideal girdle removes only the bark one-eighth to one-quarter inch wide and does not cut into the cambium.



Ringing is by no means a cure-all for every grape grower because it has a weakening effect on the vine and is not profitable with all grape varieties. The ring prevents the passage of food to the roots, which become undernourished and do not properly perform their function of obtaining water and nutrients from the soil. Consequently, top growth is checked and leaves become yellowish. More frequent irrigation and thinning makes the girdling less weakening.

Three types of thinning are practiced: flower-cluster, cluster and berry thinning. Flower-cluster thinning consists in removing some of the flower clusters soon after they emerge; cluster thinning is the removal of entire clusters soon after they emerge; and berry thinning is the removal of parts of a cluster as soon as the berries have set.

Irrigation is practiced most commonly in the vineyards of the interior valleys of California. Requiring the least amount of labor, the furrow system is used by more growers than the basin or check system. Irrigation is avoided while the vines are in bloom and during the latter part of the ripening period. However, double the frequency of irrigation is the rule while girdling wounds are open.

After harvesting the grapes are placed in a precooled refrigerator car. Precooling reduces the rate of deterioration, as does exposure to sulphur dioxide gas which represses molds and other decay-causing organisms.

Top—Girdling grape vines increases the set and size of the berries. If the ring is made at the right time, it also improves color and hastens ripening. Photo, H. Armstrong Roberts.

Inset—Before girdling, about a two-inch strip of the rough bark must be removed.

Center—Girdling cut should be made with a double-bladed knife for a uniform incision.

Bottom—After making the cut, the strip of bark is pulled from the vine. The wound should then be covered to protect the vine.

FRUIT CROP OUTLOOK FROM U.S.D.A. REPORTS

TOTAL production of fruit and nut crops is expected to be slightly smaller than last year but well above the 1929-38 average, according to the U.S.D.A. Crop Reporting Board. Estimates point towards pear, plum and citrus crops larger than last season, and peach, grape, cherry, prune, apricot, walnut and almond harvests smaller than last year.

APPLES—In the 38 states with commercial production, early July condition of apples was 59 per cent compared with 64 per cent at the same time last year and the 1929-38 average of 56 per cent. All sections except the South Central are expected to have above average production.

Rains during the blooming period in the North Atlantic States caused a lighter set of fruit than was expected. A heavy June drop coupled with rainy weather which made it difficult to get sprays on in time reduced the crop in some localities. Crop prospects are better in the Hudson Valley than in western New York. However, production has been reported as being above average for all these states.

Prospects are more variable in the North Central states. Bad weather interfered with the set of fruit and made spraying difficult. Hail damage was reported in some parts of Ohio.

Virginia growers have found that their crops are progressing well. However, hail damage and excessive apple scab favored by cool rainy weather are expected to reduce the crop. The set was light in North Carolina. Prospects are below average for South Central states.

Early July reports for the western States show that production is above the 10-year average and above the production on the same date last year. Weather conditions have been good in most sections and the fruit is sizing up well. In Oregon, production is lower than a year ago except for the Hood River Valley region which shows better prospects than last year.

April freeze damage has caused a short crop in some sections of Colorado while favorable growing conditions are giving rise to one of the best crops in years in other sections. The Idaho crop is developing well.

PEARS—Pear production is now placed at 31,240,000 bushels compared with last year's crop of 31,047,000 bushels and the 10-year average of 26,333,000 bushels. Reports indicate that Washington, Oregon and California will produce 65 per cent of the total crop. The New York crop improved during June and the harvest will probably exceed last year's production. The Michigan June drop was heavy but production is still expected to climb above last year's crop and above the 10-year average.

PEACHES—Production of peaches as indicated by early July reports will be 52,436,000 bushels as compared with the 1939 crop of 60,822,000 bushels and the 10-year average of 52,723,000 bushels. Southern states production is expected to be smaller than last year by 19 per cent. Reports show that the North Atlantic peach crop will be well above average and only slightly below the large 1939 production. The crop is almost a failure in Tennessee and in many sections of the North Central states because of winter and spring freezes. Colorado reports a record peach crop and Washington and California also expect large crops.

GRAPES—The 1940 grape crop is estimated to be four per cent less than the 1939 crop and nine per cent above the 10-year average. A crop of 2,421,930 tons is expected.

AUGUST, 1940



SAVE GAS with TRUCK-BUILT GMCs

GMC Trucks have introduced unprecedented gas economy! Owners of light-duty GMCs, like the *truck-built* pick-up shown above, report **15% to 40% more mileage** than they ever got before. That's easy to understand when you know the facts about GMC Super-Duty Engines. They're different from any others in the lowest-price field because they're built **exclusively** for truck performance. And they give you an advanced principle in

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AMERICAN FRUIT GROWER

PAGE 9



THE HORMONE SPRAY

THAT DEPENDABLY
DOES WHAT IT
SHOULD DO

Here is the spray which almost overnight has caused more interest among apple growers than any other spray in the past twenty-five years. New—unique, Sherwin-Williams STOP-DROP is the high quality, dependable naphthalene acetic acid spray that stops pre-harvest drop by hormone magic.

WHAT IT IS AND HOW IT WORKS

S-W STOP-DROP is a liquid containing a synthetic hormone such as was found last year by the Bureau of Plant Industry, U.S.D.A., to be remarkably effective in stopping the premature drop of apples. It becomes effective in 24-48 hours and remains effective with most varieties from two to three weeks.

S-W STOP-DROP holds the fruit on the trees—it stops the drop and apples stay on the trees longer and consequently increase in size, quality and color.

HOW YOU BENEFIT

S-W STOP-DROP greatly cuts your percentage of culs by keeping apples on the trees for the extra days that give EXTRA SIZE AND EXTRA COLOR, which in turn bring you a price with an EXTRA PROFIT. In S-W STOP-DROP you are assured of a hormone spray with Sherwin-Williams high STANDARDS OF QUALITY.

ORDER AT ONCE TO ASSURE DELIVERY

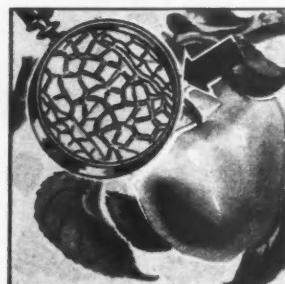
To prevent taking a needless loss on premature drop of a large part of this year's crop, order your supply of S-W STOP-DROP at once to assure immediate delivery for use on early as well as late varieties of apples.

SEND FOR FREE FOLDER

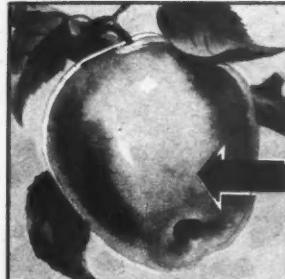
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Why Apples Drop—Pre-Harvest drop of apples is caused by premature development of the abscission layer which in effect "cuts" the stem from the spur.



How STOP-DROP Works—This spray contains certain hormones that penetrate the stem of the apple and retard the formation of the abscission layer, shown under magnifying glass.



Extra Color and Size Result—S-W STOP-DROP holds apples on the trees for the extra weeks needed to give the fruit the Extra Size and Extra Color which bring Extra Profits.

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APS

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Important Contributions

STATE horticultural society reports contain a vast amount of practical information for the fruit grower. At the annual state horticultural society meetings, the scientists talk the fruit growers' language; fruit growers talk the language of the orchard. The contributions of these men are invaluable from the standpoint of furthering the fruit industry.

The report of the last meeting of the Washington State Horticultural Association contains some pertinent items covering a wide range of horticultural subjects. Charles F. Morrison, a peach grower at Zillah, Wash., in discussing peach production practices in the Yakima Valley, said:

"Since the removal of so many apple orchards, growers are thinking of replacing them with soft fruits. I have been trying to do this for some 10 years, with very indifferent results. Five years ago I planted 200 peach trees where apples had been removed. In the fall of 1939 I took them out because so few were doing well. Not a single tree had healthy roots; even those that were doing well had knots and galls, and many of the poorer ones had almost no roots left. Aside from the fact that trees are hard to start on such lands, the disease organisms remaining in the soil are a great obstacle to successful replanting. It is possible that this trouble can be overcome by the use of chloropicrin or other soil fumigants, but until research has developed a method, it would be well for growers to bear in mind that trees set in apple ground face the likelihood, if not the certainty, of root disease, in addition to a toxic soil."

"One of the sore spots of the industry is the shipping of immature fruit. Probably both growers and shippers are to be blamed for it but it comes back, primarily, to the grower, who should have pride enough in his product and knowledge enough of his business to pick only peaches which show the creamy under-color which indicates proper maturity for shipping."

A.S.H.S. Meeting

The Great Plains section of the American Society for Horticultural Science will hold its annual meeting in the Province of Manitoba, Canada, August 19-21. This annual meeting will attract many workers in the field of horticulture and particularly those engaged in fruit breeding and variety testing.

At the Dominion Experiment Station at Morden, fruit breeding and variety testing work are carried on on an extensive scale. The men engaged in this work at Morden have brought together a vast amount of material on hardiness which provides a basis for intensive studies.

The formal program will deal with problems in the breeding and selection of hardy fruits, vegetables and ornamental plants. Dr. A. N. Wilcox, Horticulture Division, University of Minnesota, is president and W. L. Kerr, fruit breeder, Dominion Experiment Station, Morden, Manitoba, is secretary of the organization.

N.L. Lantz
SECRETARY

AUGUST, 1940

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CIDER PRESSES, GRATERS, FILTERS, PUMPS AND supplies. Booklet how to keep cider sweet and money from cull apples. Free. PALMER BROS., Cos Cob, Connecticut.

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CIDER MILL SUPPLIES MUST REFLECT A KNOWLEDGE of your needs. Mount Gilead Cider Mill Supplies have been the choice of orchardists for half a century. Write for the new Catalog 8301-R and price list. THE HYDRAULIC PRESS MFG. COMPANY, 402 Lincoln Ave., Mount Gilead, Ohio.

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CROTALARIA SEED: SPECTABILIS, 8c POUND; INTERMEDIA, 15c pound. GRAND ISLAND NURSERIES, Eustis, Florida.

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210-ACRE APPLE ORCHARD. SPLENDID LOCAL fruit market. Only large orchard in territory. Trees properly pruned and sprayed. 440 acres in farm, 5 miles south of Versailles, Missouri, on main highway, vicinity Lake of the Ozarks. Roadside market; 3 sets improvements; abundant water. Bank liquidating properly completely equipped, at low price. RAY D. JONES, 310 Ward Parkway, Kansas City, Missouri.

1 NO. OSH BEAN APPLE GRADER AND ELIMINATOR with 3 sizing sections. 1 No. 7 Two Way cleaner with feed belt, with 2 H.P. electric motor. All equipment in A1 condition. CINCINNATI PRODUCE GROWERS ASSOCIATION, 9 W. Water St., Cincinnati, Ohio.

FOR HANDLING THE MOST TENDER FRUIT SAFELY, economically, and quickly, write us for information regarding our Peach and Apple Picking Bags. TOWNSEND COMPANY, Lake Wales, Florida.

100-ACRE PRODUCING ORCHARD \$15,000.00. DELICIOUS, Stayman, Yorks. HARRY WILLIS, Winchester, Virginia.

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MILLIONS CERTIFIED YELLOW FREE BLAKEMORE strawberry plants. Write for prices. R. R. McUMBER, Greenfield, Tennessee.

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WRITE FOR FREE LARGE 1940 CATALOG OF USED and new tractor parts. Satisfaction guaranteed. CENTRAL TRACTOR WRECKING COMPANY, Boone, Iowa. AUGUST, 1940

LEAFHOPPERS

(Continued from page 7)

much larger than the first. The weekly counts of leafhoppers so far this season on an entire McIntosh apple tree 28 feet high were as follows:

May 6—	48,772	10—	47,146
13—	87,609	17—	49,956
20—	180,021	24—	70,087
27—	115,066	July 1—	48,049
June 3—	64,849	8—	48,772

Average for 10 weeks 68,823

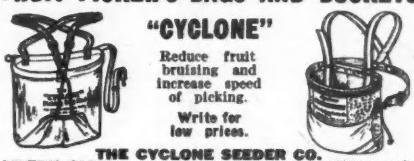
The number of leaves on this McIntosh tree on May 17 totaled around 180,638, in which case there would be about one leafhopper to every two or three apple leaves. When leafhoppers become this prevalent, it is generally recommended that one pint of nicotine sulphate be added to each 100 gallons of spray. This insect must be directly hit by the spray before it is killed.

In conjunction with this field study of habits and population counts of the various species, numerous tests have been made in the greenhouse and "weather-control" chamber at Ohio State University to determine the approximate correlation between apparent injury to leaves and the reduction in amount of food which they manufacture. This was done by carefully collecting and sorting the species of leafhoppers found in southern Indiana, packing them in ventilated packages and shipping to Columbus, Ohio, where they were "boarded" until given a chance to feed on the experimental leaves.

To make a metabolism test, a young apple tree which bore two shoots of healthy leaves was transferred from the greenhouse to the weather-control chamber. Leaf cups as shown in Figure 3 then were attached to the individual leaves. Tests were made over an initial four-day period to determine the relationship in rate of photosynthesis between the leaves on one shoot as compared with photosynthesis of leaves on the other shoot. When this relationship was established, a cheesecloth bag was placed over the leaves of one shoot, as shown by Mr. Brody in Figure 1. A given

(Continued on page 12)

FRUIT PICKER'S BAGS AND BUCKETS



"CYCLONE"

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MICHIGAN AT CONGRESS GEO. H. MINK, Manager



Write for Beauty School Bulletin

MORRIS HARVEY COLLEGE

Charleston, West Virginia



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Shawnee-on-Delaware, Pennsylvania

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Shawnee Country Club, scene of the annual Shawnee Open and the 1938 P.G.A. Championship. Sam Snead, Professional.

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Parmone reduces pre-harvest drop of apples resulting in improved color, quality, and size.

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When at the World's Fair for National Farm Week, August 12-18, you are cordially invited to make the du Pont Wonder World of Chemistry Exhibit your headquarters.

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Spray Oils
Bordeaux Mixture

LEAFHOPPERS

(Continued from page 11)

number of leafhoppers was released in the cage and allowed to feed upon the leaves over a given time, after which the cage was removed, the leaves again attached to the cups, and tests made to determine whether the feeding had caused any shift in the original photosynthetic relationship between the two sets of leaves.

Figure 2 shows how a fairly large number of these insects feeding over several days' time may reduce food manufacture by apple leaves. Of course, in this particular experiment the injury was somewhat intensified over a relatively short period of 50 days by use of many leafhoppers. At the end of only seven days, with injury similar to that shown in Figure 3, there was about a 35 per cent reduction in food manufacture by the leaves. At the end of 30 and 50 days, the leaves appeared very much the same as apple leaves often do at harvest time, and also in June or July when there is an extremely heavy population of hoppers early in the season. Such early infestations were cited the middle of this July in Middlesex County of Massachusetts by the fruit specialist, Elbert L. Agnew. He reported that many trees in that county had a large percentage of whitish-green leaves, some of which were abscising due to the intense leafhopper feeding.

It is of interest to note that as feeding injury was gradually increased by subjecting the leaves to the hoppers at given intervals, photosynthesis and transpiration (loss of water vapor through the leaf skin) usually showed very little, if any, reduction due to a small amount of injury, which would be similar to about one-fourth the injury shown in Figure 3. This is difficult to explain unless it is due to the leafhopper removing sap, and perhaps chlorophyll, from a region of compact cells in the upper layers of the leaf blade, thus admitting more light to the loosely arranged cells in the lower section of the leaf blade where photosynthesis probably is carried on at a relatively faster rate. (The leaf of apple has pores or stomata only in the lower epidermis which would permit carbon dioxide from outside air to reach this lower mass of cells first). It may be speculated, also, that under natural conditions the leaf ordinarily has an excess of chlorophyll and other cell materials and the removal of a small portion of these may have no immediate effect on photosynthesis. Nevertheless, it appears that after the insects have removed or "inactivated" cell ingredients to a certain point, the rate of photosynthesis suddenly drops to around 20 or 30 per cent and remains at this approximate level until injury has reached another intensity, where it again drops further. Our tests have shown that it is possible to almost stop photosynthesis by allowing the leafhoppers to feed upon the leaves until they are practically white on the upper surface.

Ordinarily, the rate of transpiration by apple leaves does not show as marked reductions as photosynthesis when feeding injury occurs. This may be due to the fact that the species of leafhoppers used here feed mostly between the large and very small veins in which the water is transported. In view of the fact that loss of water vapor from leaves is very much a function of temperature, evaporation of water could proceed fairly well even though portions of the compact upper palisade cells in a leaf blade were destroyed.

As yet, no tests have been made on the effect of the potato leafhopper feeding injury on photosynthesis and transpiration of apple leaves. These are the leafhoppers which pierce with their mouth parts the veins of the apple leaves and cause those near the tip of shoots to curl under and develop a mottled green and yellowish-white color over the upper surface. This curling may occur aside from aphid injury. It is

(Continued on page 15)

AUGUST, 1948

NEW

By HANDY ANDY

BRUSHER AND POLISHER •

Space is always at a premium during the packing season. Butler Manufacturing & Machinery Company's new "Champion" fruit brusher and polisher answers this problem in a practicable manner. Overall length of the lightweight, portable Champion is nine feet.

As in Butler fruit graders, the fruit in the Champion moves forward in rows by means of wood rollers covered with soft carpet. Each alternate roller is spirally wrapped with smooth rope, to turn the fruit over and over as it moves forward to the discharge end. As it travels over the rollers, the fruit is in continuous contact with adjustable overhead brushes and circular cloth buffers, revolving at high speed, thus thoroughly clean-



ing and polishing the fruit.

The machine, including the hopper and discharge tray, is padded with sponge rubber. The detachable tray is used when the fruit is graded first and then cleaned; otherwise the fruit is discharged to conveyor of grader. A canvas apron not only serves as an end-gate for the tray, but when lowered, eases the fall of the fruit into the basket.

Of all-metal construction, the Champion is equipped with one-third horsepower motor; gasoline engine will be furnished if desired. Legs are adjustable so that discharge chute may be raised 12 inches. Machine is 31 inches long, not including the 29-inch hopper, and weighs about 250 pounds. A special compartment, with blower, is furnished extra. The machine is complete in all other respects.

DRIVE SCREW NAILS •

Growers who are planning to build storages or other types of buildings, or do construction repair jobs, will welcome the news that a permanent, reliable fastener is available for all types of materials, including wood, steel, building boards, combinations of these materials, and even concrete. Helyx drive screw nails, the manufacturers claim, are 100 per cent stronger than other nails and have the holding power of screws. As can be seen in the illustration,

- BRUSHER AND POLISHER
- DRIVE SCREW NAILS
- BULB EXTENSION

the thread runs the full length of the shank, which accounts for this greater holding power over ordinary nails. A screw driver is not required to drive the nails, so it can be readily appreciated that they must necessarily be made of highest quality steel. Helyx nails, made by the Hillwood Manufacturing Company, are available in various sizes, to fit the grower's needs.

UNCLE NED'S 100 How-to-Fix-Its is the title of Rutland Fire Clay Company's useful vest-pocket-size booklet, obtainable

upon request. Repair jobs, such as clogged drain pipe, insulating the hot water tank, protecting sawed tree branches, painting new galvanized iron, dust-proofing the cement floor, and 95 others, are explained in simple, workable manner.

BULB EXTENSION •

How many times have you wished for a flashlight that really gets into a three-eighths-inch crevice, thus enabling you to explore machinery, locate lost objects, spy out borers at the base of trees, etc.?



An answer to this need has been provided in the novel flashlight bulb extension shown here. It consists of a long wire which screws into any flashlight, with a bulb on the opposite end. An unusual feature is that it is bendable, thus illumination can be directed where desired. It is a handy accessory not only for field use but wherever light must be located in difficult-to-get-at places. It is known as the Sierra Flashlight Bulb Extension and is made of copper wire encased in aluminum alloy tubing. Made in lengths from six to 36 inches by the Sierra Aircraft Company.



"Wenatchee" PATENTED FRUIT PICKING BAGS

Here used every year by leading growers in every state.

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STATE NEWS

CALIFORNIA—Sales are made when buyers are in a mood to buy. Thus aggressive Citrus Sales, Inc., newly organized co-operative organization of southern California, and far-flung Union Oil Company are pooling their efforts in a new venture that promises to open an untapped outlet of no mean proportions for citrus products.

It is planned to serve the parched motorist pure "coolers" of citrus juices while his car is being serviced. Juice dispensing installations are already being set up in Union Oil service stations, and other major oil companies are expected to co-operate similarly.

Described as a new product, the "coolers" consist of a specially prepared orange ice which is mixed with a portion of freshly extracted orange juice. A four-ounce serving sells for five cents. Lemonade and grapefruit juice will also be handled at the stands.

Plan of operation for Citrus Sales, Inc., which is sponsored by 12 Sunkist packing associations, also calls for the sale of high quality fresh oranges in mesh bags to the motoring public.

KANSAS—Some pioneer work is being done by Emmett Blood, successful peach grower near Wichita, which will prove of value to growers throughout the Arkansas River Valley district. In an experimental plot Mr. Blood has planted about 25 of the newer varieties of peaches. He is carefully watching these trees and keeping detailed records of their behavior, in an effort to determine the adaptability of the various varieties to the district. Thus growers contemplating extensive plantings of the newer sorts in the near future will have practical data to guide them in their selection.—GEO. W. KINKEAD, Sec'y, Topeka.

MAINE—The orchard of A. C. Whittier in the old apple town of Monmouth, Kennebec County, was the meeting place for the apple men who took part in the recent twilight discussions and tour of two young, cultivated blocks. A cultivated orchard is by way of being an unusual sight here and looked good to one formerly accustomed to such culture—but the trees were not better than in other orchards of same age in sod with mulch; rather, not so large.

The group, in discussion on the barn floor, roundly condemned the detail questions of the current orchard survey, beyond the ability of the discussion leader to defend. It seems that orchards here grow just like Topsy, by small unrecorded increments and many replacements, so that the owner does not know or care to find out how many of this and that variety he has in each of several age groups. Likewise, he sells his apples through a number of channels and neither records nor much cares what proportion goes through each.

Apple thinning was discussed briefly. Information among the men was up to scratch, but practice rather backward. One representing, as manager, an orchard spread over some 178 acres and of some 7000 trees, gave, as a valid reason for not thinning, the fact of having to mow all that acreage and trim it with scythes. One can only question whether thinning may not be the more important, and whether it ought not be done because it pays, rather than undone because the result of mowing is more obvious.

Dr. F. H. Lathrop, entomologist, was called upon to answer questions about the apple fruit fly, red mite, aphids & Co. He told of an orchard near-by, long totally infested, in which one season's spraying made marked improvement.

ment, two seasons' almost eliminated the infestation of fruit, and a subsequent season's neglect brought them back again.

Red mites have at times been a cause of anxiety in this county. Dr. Lathrop told how, curiously, an abundance of eggs at harvest need not be followed by many mites the following season. In spraying tests, a moderate population of mites may suddenly disappear within a few days between observations from sprayed and unsprayed trees alike. Delayed-dormant oil application is the preferred control, but only necessary under extreme conditions. Spring and summer sulphurs, particularly lime-sulphurs, aid control.

The Pomological Field Day on August 21 at the Wyman Farm, Manchester, will give growers an opportunity to see a demonstration of the new hormone anti-drop spray.—J. H. WARING, Orono.

INDIANA—Mark a big ring around the date, August 23, for that is when the summer meeting of the Indiana Horticultural Society will be held at Purdue University, Lafayette. The all-day meet will consist of tours through the university orchards and nurseries to examine the various experiments. Rootstock, orchard floor and tree spraying for insect and disease control, and orchard management and cover crop experimental plots will be visited. The men who are conducting the work will discuss their results to date. Results of blossom and fruit thinning can be observed, as well as experiments to increase fruit set by hormone sprays. The afternoon will be devoted primarily to a general discussion of grower problems.—R. L. WINKLEPLECK, Sec'y, Lafayette.

VIRGINIA—H. Carrington Jordan, 45, outstanding progressive leader in the fruit industry, met an untimely death on July 3 when he drowned while attempting to rescue

a fellow fisherman. Mr. Jordan was manager and part owner of High Peak Orchard near Monroe and was at one time director of the State Horticultural Society.

NEW YORK—Cultivation of the improved varieties of the highbush blueberry is a relatively new horticultural industry that is attracting considerable attention. To guide prospective planters of this fruit, a circular has been prepared by the Agricultural Experiment Station at Geneva, entitled, "The Blueberry in New York," which covers site selection, culture, varieties, etc. It is known as Circular No. 189.

OHIO—The concentrated Little Hocking fruit growing section will furnish the background for the southern Ohio meeting of the State Horticultural Society on August 9. The program will be held in the spacious storage on the C. H. Oakes fruit farm, two miles west of Little Hocking, on Route 50. Automobile tours of the Oakes orchard as well as neighboring orchards and storages will be made.

The northern Ohio summer meeting of the society will be held in connection with Orchard Day of the Agricultural Experiment Station at Wooster, August 16. A tour of the experiment station orchards will be made in the morning. Prof. F. N. Fagan, well-known horticulturist of Pennsylvania, and principal speaker in the afternoon, will discuss the important subject, "Lessons from Experimental Work Pointing to Lower Production Costs Without Reduction of Yields and Grades."

DELaware—"We in the Department of Horticulture feel that our duty is to bring to the fruit and vegetable growers of Delaware new cultural practices and new ways to carry on old, established practices so they can produce crops more profitably . . ."

With these words Dr. K. J. Kadow summed up the activities of the Department of Horticulture of Delaware Agricultural Experiment Station as he will direct them since becoming Acting Head of the Department on July 1.

Dr. Kadow's horticultural training and practical fruit growing experience fit him particularly well for his new post. He is well known among Delaware fruit growers through his work during the past two and one-half years as associate plant pathologist for the University of Delaware and as plant pathologist for the State Board of Agriculture since 1939.

MICHIGAN—Upon completion of a two-story reinforced concrete addition late this summer, the South Haven Fruit Exchange will up the capacity of their cold storage plant to 150 cars. The addition, which will take care of 40,000 bushels, will be cork insulated and cooled by three ice machines and a modern air diffusor. Fruit will be carried by gravity conveyor from the packing house into the storage rooms. A 125-foot loading platform for trucks is also being constructed. The exchange, which is located on the New York Central Railroad, at present has facilities for loading 10 cars at one time.

MARYLAND—In the Green Lane orchard of Stanley Fulton in the Hancock section a replanting system is followed where young trees, amply manured and fertilized, are grown in the rows between the older trees. The plan is to cut back the old trees until the younger trees are well established, then remove the old trees.—A. F. VIERHELLER, Sec'y, College Park.

AUGUST, 1940



FOOD AFFINITIES

A merchandising trend that is gaining momentum in retail outlets is the displaying of related food products. The Georgia-Carolina Peaches Marketing Board have this season further developed this dual sales trend by creating the special point of sale display material shown at top and center in above mass display of breakfast foods and peaches.

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Without obligation send at once samples, prices and full details of Bemis Open-Mesh Apple Bags.

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NUT GROWERS TO MEET

THE Northern Nut Growers Association will hold its 31st annual meeting in Roanoke, Va., September 5-7, 1940. H. F. Stoke of Roanoke and C. A. Reed of Beltsville, Md., have arranged an interesting program featuring the kinds and varieties of nuts adapted to that latitude. Of especial interest will be several papers devoted to chestnuts with which Mr. Stoke is doing considerable work. He is interested in the possibilities of the Oriental chestnuts as an orchard crop in Virginia where they seem to be well adapted to the soils and climate. Mr. Stoke will preside over a session devoted to chestnuts.

Another session will be devoted to reports on the history and status of nut culture in the various states. F. E. Brown will discuss the mountain methods of producing black walnut kernels and A. E. Smalley will describe and illustrate his system of mechanical cracking and separation of walnut kernels. Of especial interest on the walnut program is a paper by Mr. Lamb on "Figured Grain in Walnut and other Species."

Other phases of nut culture will be handled by various authorities. Field trips to plantings of chestnuts and other nut trees are scheduled.

Hotel Roanoke will be headquarters. Tourist places are available on Route 11 near Roanoke. Meetings and exhibits will be held at the Hotel Roanoke.

Members are requested to bring or send exhibits of new and old varieties of nuts, grafting tools or cracking devices. The nut exhibit is always a source of much interest to members and guests and is an important factor in stimulating the interest of prospective growers. Programs may be had from H. F. Stoke, 1421 Watts Ave., Roanoke, Va., after August 15.—GEORGE L. SLATE, Sec'y, Northern Nut Growers' Assn., Geneva, N.Y.

LEAFHOPPERS

(Continued from page 12)

probable, too, that these insects markedly affect in about the same proportion the rate of transpiration and food manufacture by apple leaves by obstructing the passage of water and carbohydrates through the leaf veins.

In conclusion, it should be stated that infestations of leafhoppers in apple orchards should not be taken too lightly, especially when noticeable amounts of leaf injury begin to develop. A 20 to 50 per cent reduction in the daily food manufacture by an apple tree beginning early in the season can appreciably reduce the total amount of food which goes to increase size and color of the fruit as well as form fruit buds which initiate the crop the following year. Even when this amount of injury develops late in the season, it would greatly reduce the total food present in the bark and wood tissues during the winter and also in early spring when shoot growth and blossoming creates a heavy demand for it. Also, it should be recalled, as Dr. E. M. Hildebrand of Cornell University has pointed out, that leafhoppers during the growing season are active carriers of the fire blight organism. The insects track through the bacterial ooze, suck sap from infected shoots and spurs and thus pick up and transport numerous organisms from shoot to shoot and from tree to tree. Besides the use of nicotine sulphate, or some form of this ingredient in the spray schedule, it is possible to reduce leafhopper population in an orchard by removing lower limbs of trees which lay on mats of dead leaves and grass, and also by removing water sprouts and other "thin wood" in the centers and lower portions of trees. The occasional burning of fence rows in the spring helps to reduce harboring places and, in addition, kills many of the adults.

SMALL...Enough to Get Under the Trees!

If you want proof of such genuine enthusiasm, ask the nearest Cletrac dealer to demonstrate the Model HG-31 Cletrac in your orchard. You'll be in for a surprise, too.

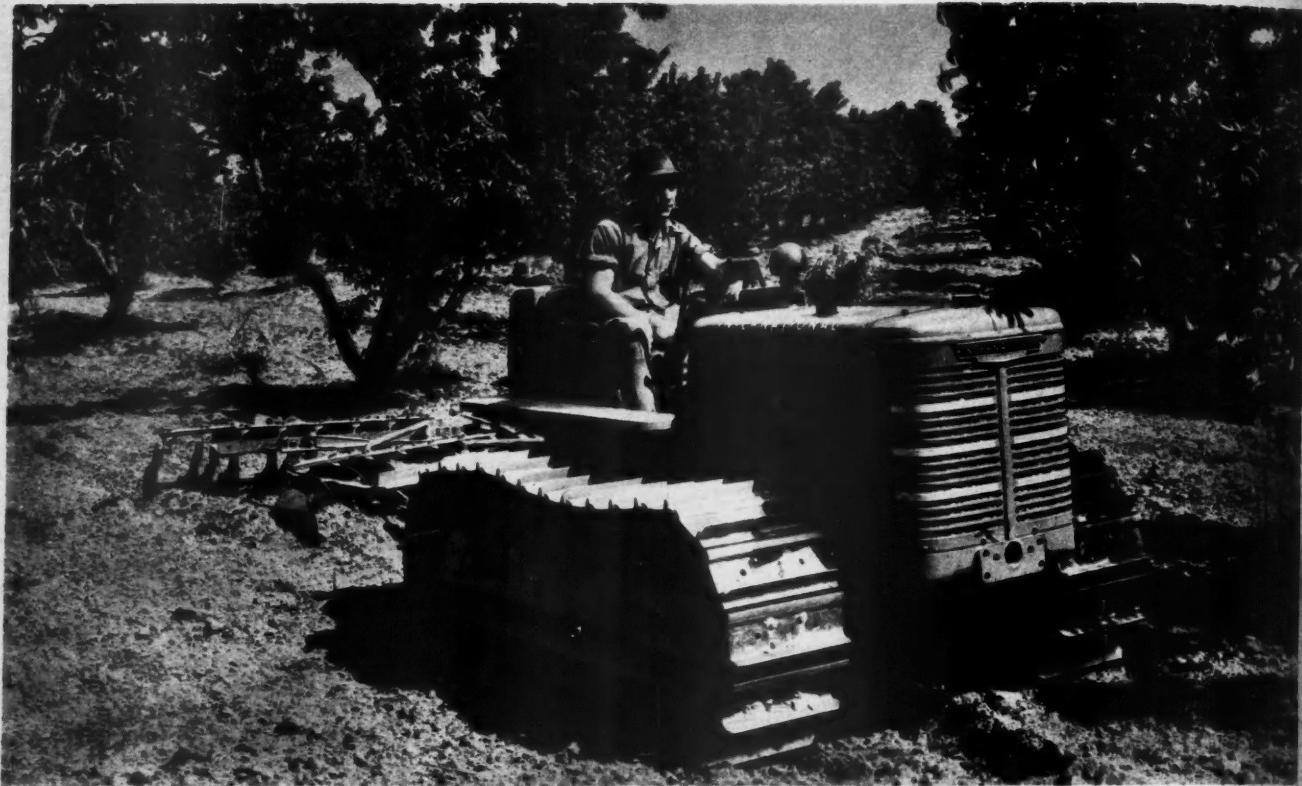
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"I asked for a demonstration of your 31" Cyclone and I want to tell you '31" Cyclone and I want to tell you it's the slickest little surprise packin' I ever saw. It handles the load like ours have got to have it. up, and big growers with close plantin' like ours have got to have it. up,

Read what Mr. Ballard says about the HG-31 Cletrac—we know you'll like it too.

WRITE NAME AND ADDRESS HERE AND MAIL FOR COMPLETE INFORMATION. 1 FARM ACRES THE CLEVELAND TRACTOR COMPANY, 19310 EUCLID AVENUE, CLEVELAND, OHIO

Keep on the PROFIT SIDE with INTERNATIONAL TracTracTors



Thorough disking at low cost with an International TD-6 Diesel TracTractor and McCormick-Deering No. 12-B Disc Harrow. This equipment is owned by H. B. Gay, Zillah, Wash.

In terms of *performance, operating economy, low maintenance, and long life*, the four new International Diesel TracTracTors are in a class by themselves . . . far ahead of anything you've seen yet in crawler power.

Choose the size best suited for your work. The smallest of the four crawlers, the Model TD-6, is recommended for most orchard operations. The TD-9, next in size, is another practical model for orchard work. When you get up into the TD-14 and TD-18 size, you have ample power for the heaviest tillage operations.

This quartet has *everything* users have needed and asked for in crawler tractors. On-the-job evidence proves the great value of such points as

these: Quick, easy starting, *full* International Diesel engines that really provide *full* Diesel fuel economy; wide range of traveling speeds and fast gear shifting; easy-operated, multiple-disk steering clutches; *exclusive* track frame stabilizer and ball-and-socket pivot construction which relieves the pivot shaft and track frame of leverage loads and assures positive track alignment; long-lived, quintuple-sealed track rollers; and accessibility that can't be matched.

Get acquainted with International Diesel TracTracTors. Call the nearby International Harvester dealer or branch.

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